PaveScan survey in Finland 2018

SURVEY RESULTS

A brief summary of the survey results from last year’s cooperation between the Swedish Transport Administration and the Finnish Transport Infrastructure Agency.

FINNISH PANK

A comparison between the Finnish PANK and the method used by the Swedish Transport Administration for correlating data to the PaveScan system.

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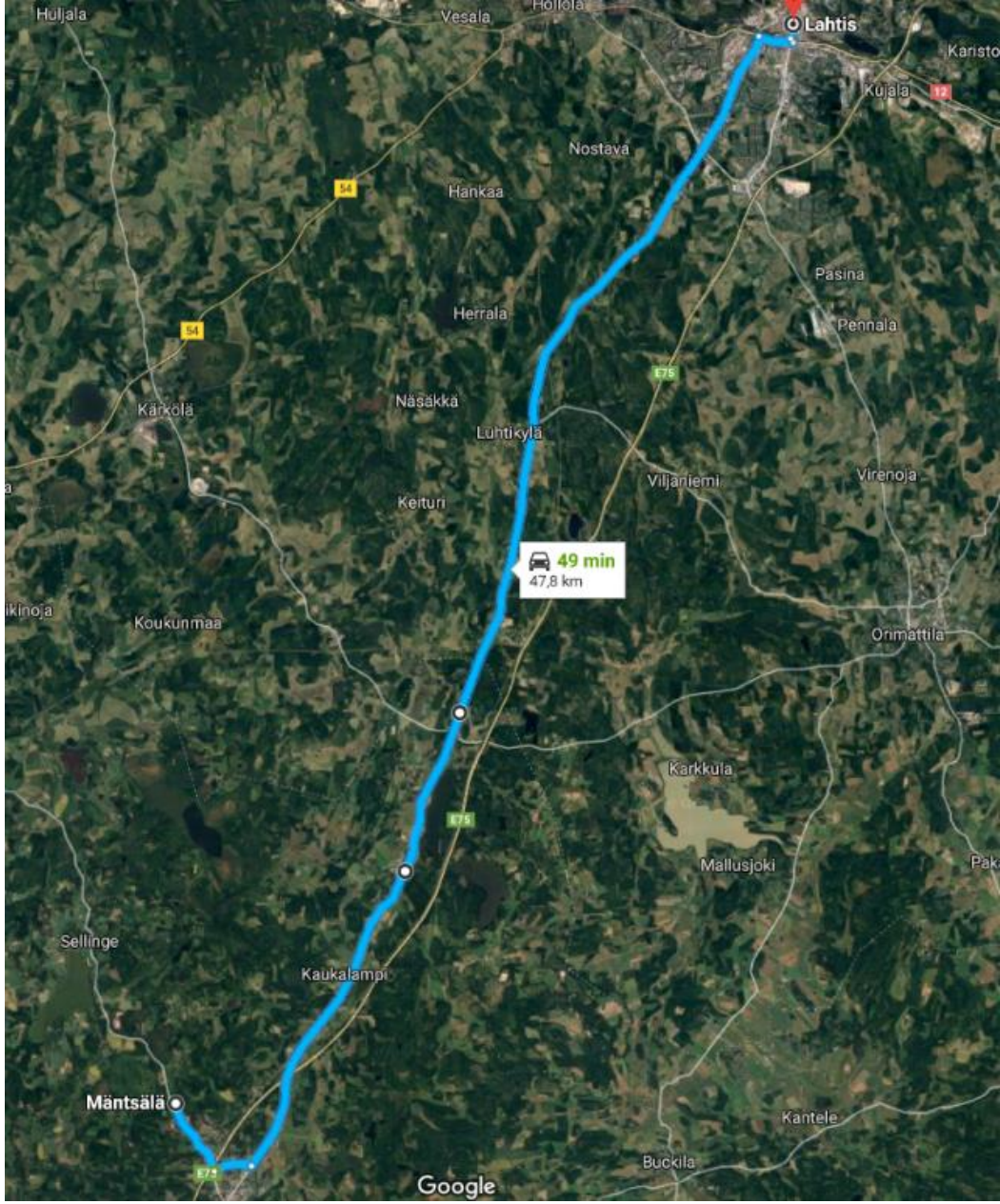
SURVEY INFORMATION

Survey Area
R140 Lahti - Mäntsälä

Surveys performed between 06 – 09 of august 2018

- Roller setup changed each day of paving
  - Testing different ICMV systems
- Surveys with one Georadar System:
  - PaveScan
- Surveys with two georadar systems:
  - PaveScan & RoadScan



SURVEY INFORMATION

System Specifications

GSSI PaveScan RDM

- 3 Channels
  - 2,5 Ghz Air coupled antennas
- Positioning
  - Odometer
  - GPS (Not RTK)
- Data
  - Data logged in increments of ~0,18 m

Survey Results

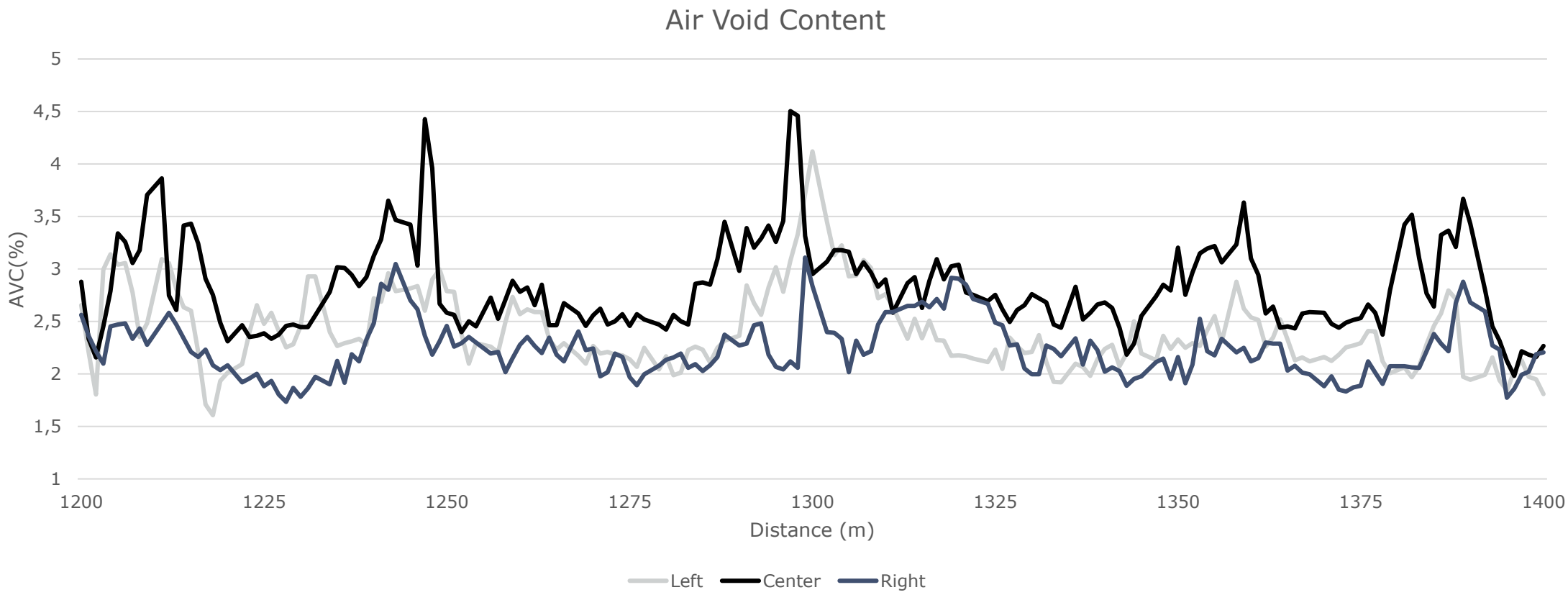
Some issues were detected but still passed the criteria set in 2018.

Registered deviations

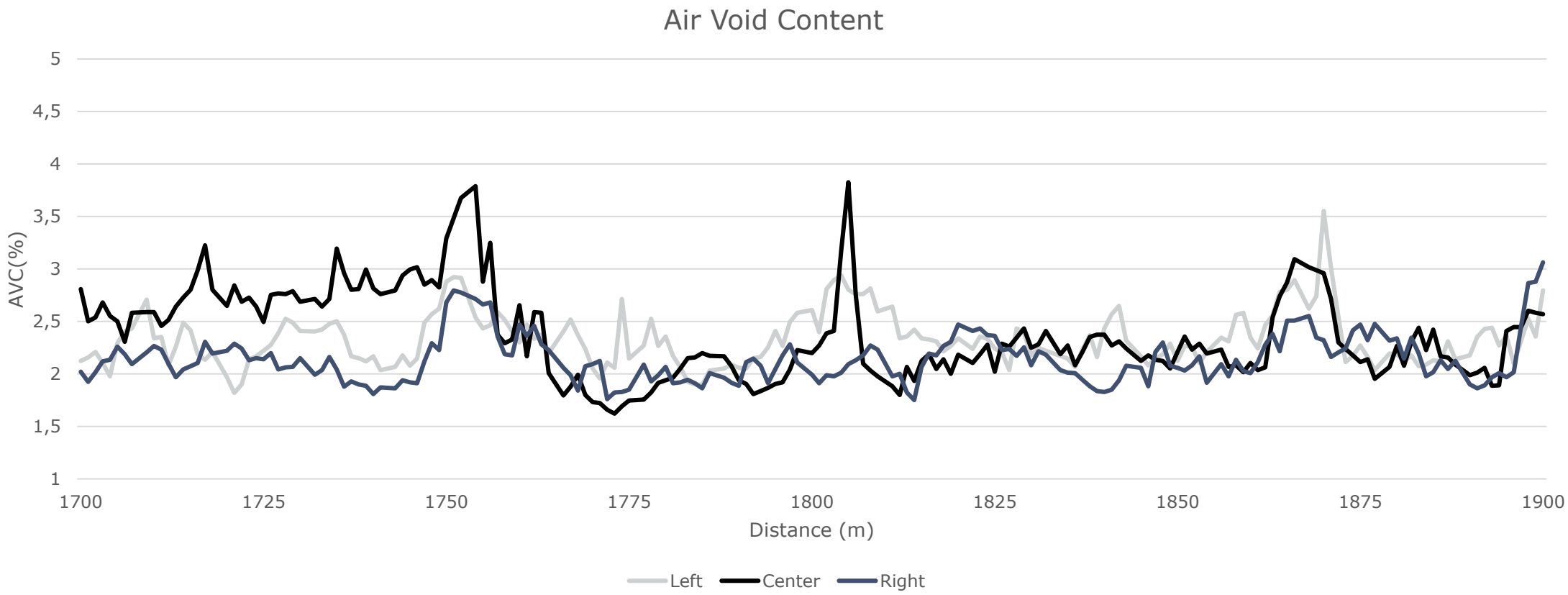
- Intermittent fluctuations in dielectric values.
  - Spaced ~50 meters apart, likely issues connected to load changes in paver.
- Transverse variations between channels.
  - Antennas registered lower dielectric values in the center lane.

	Good	Pass	Bad
Variance	>20%		
Standard Deviation	< 0.7	0.7 - 1.0	> 1.0
Delta	< 0.6	0.6 - 1.0	> 1.0

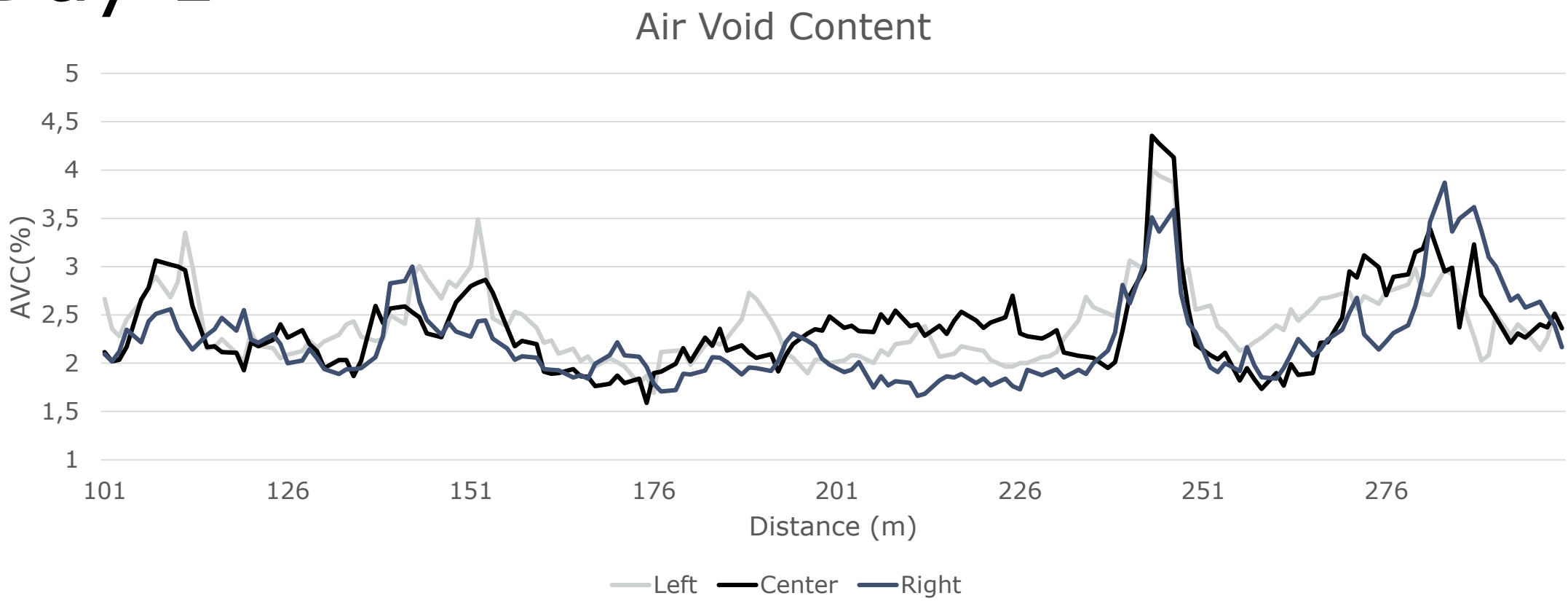
Survey Results



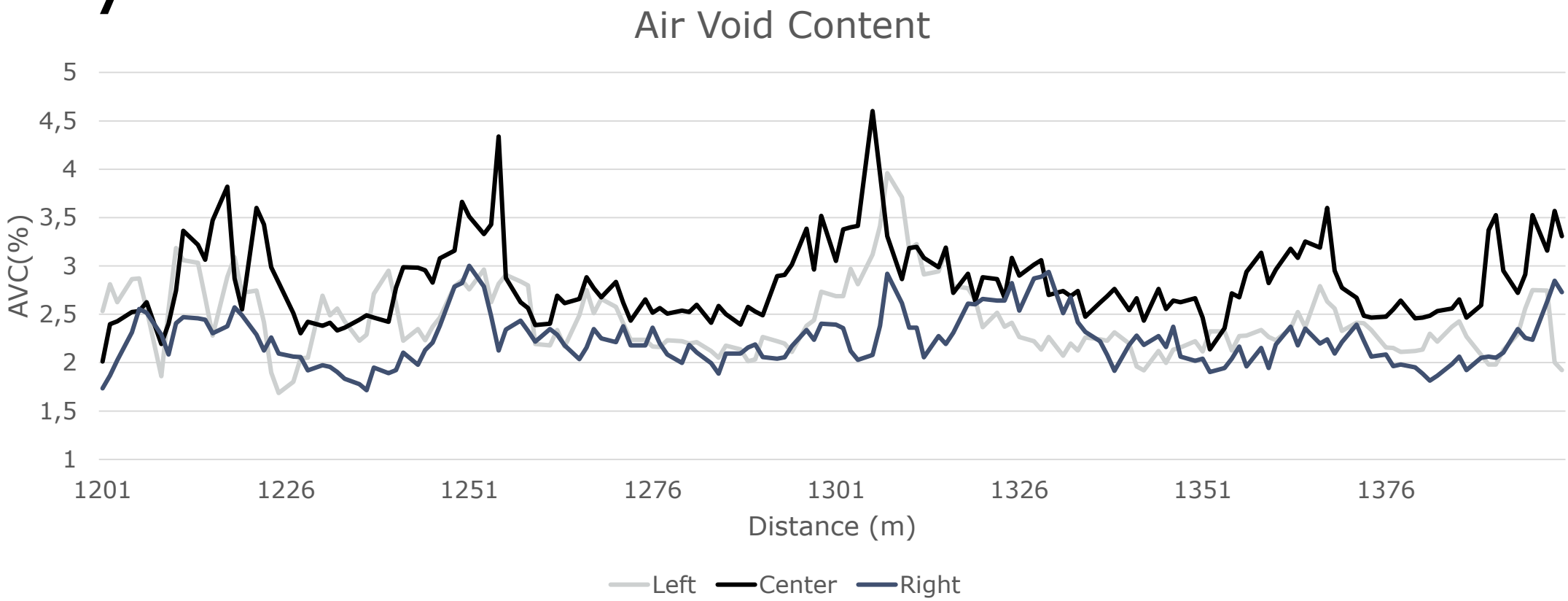
Survey Results



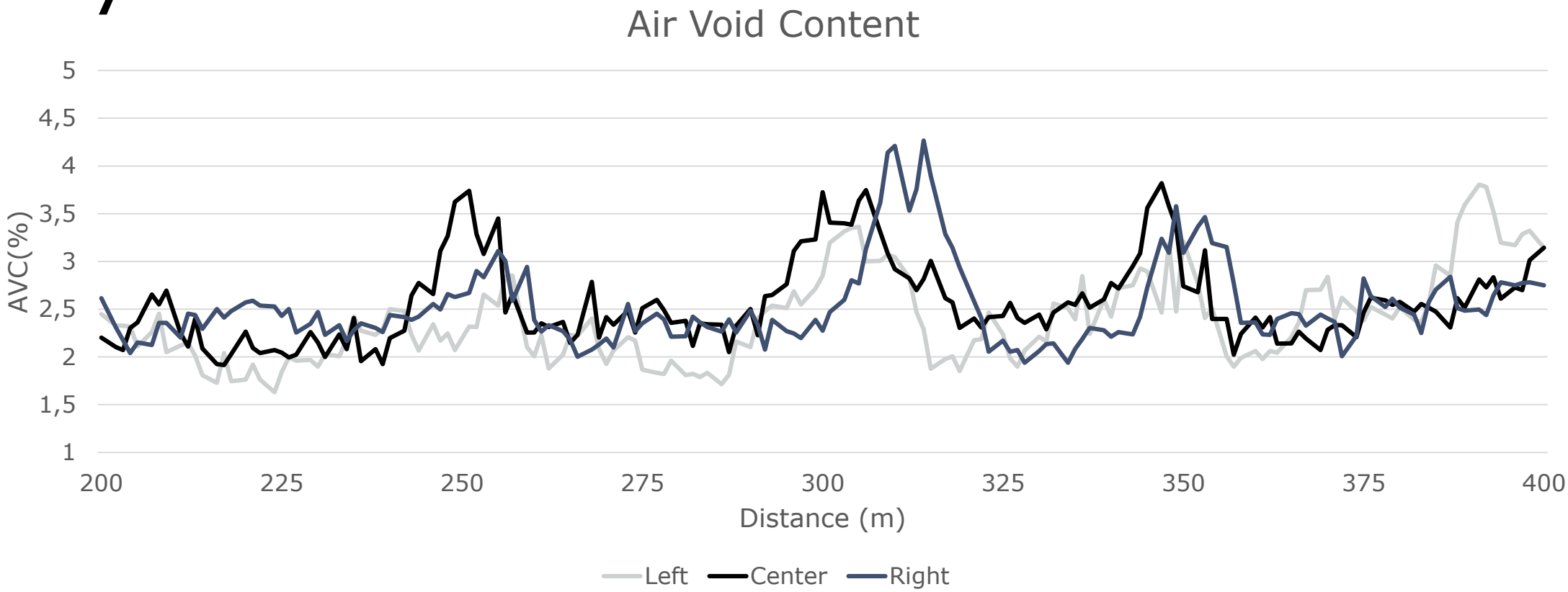
Day 1


Air Void Content
AVC(%)
5
4,5
4
3,5
3
2,5
2
1,5
1
101
126
151
176
201
226
251
276
Distance (m)
Left
Center
Right

Day 2


Air Void Content
AVC(%)
5
4,5
4
3,5
3
2,5
2
1,5
1
1201
1226
1251
1276
1301
1326
1351
1376
Distance (m)
Left
Center
Right

Day 3


Air Void Content
AVC(%)
5
4,5
4
3,5
3
2,5
2
1,5
1
200
225
250
275
300
325
350
375
400
Distance (m)
Left
Center
Right

Logged data

Survey results are correlated and presented as Air Void Content.

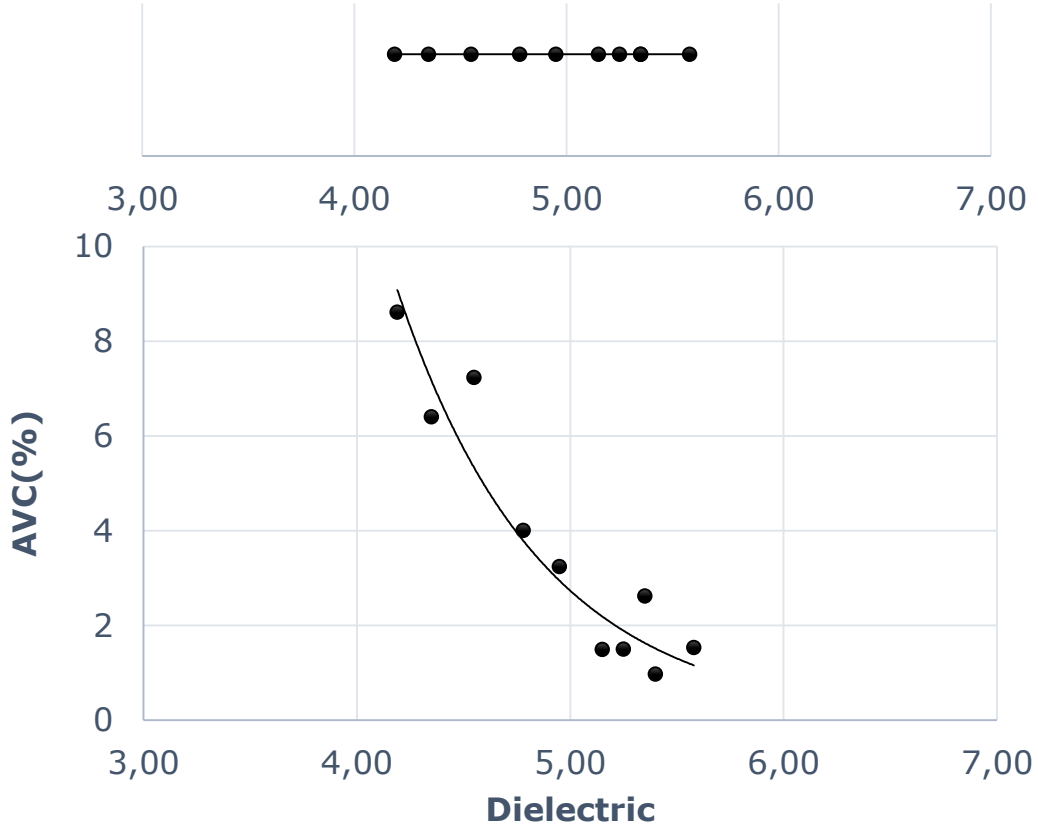
- 6 Static Surveys each logged with:
  - Dielectric Values.
  - 150 mm Core Sample
  - Temperature.
  - Humidity.
  - GPS coordinates
  - Lane position.

Object	Dielectric	AVC(%)	°C	H_2O
B1	4,35	6,4	47,7	60,8
B2	4,19	8,6	36,3	51,5
B3	4,95	3,2	43,6	56,1
B4	5,15	1,5	44,0	59,3
B5	5,25	1,5	40,9	54,5
B6	4,55	7,2	39,2	58,6
B7	5,40	1,0	41,2	61,5
B8	5,58	1,5	40,0	61,6
B9	4,78	4,0	39,1	57,0
B10	5,35	2,6	43,6	53,7

Correlation to AVC

Top layer

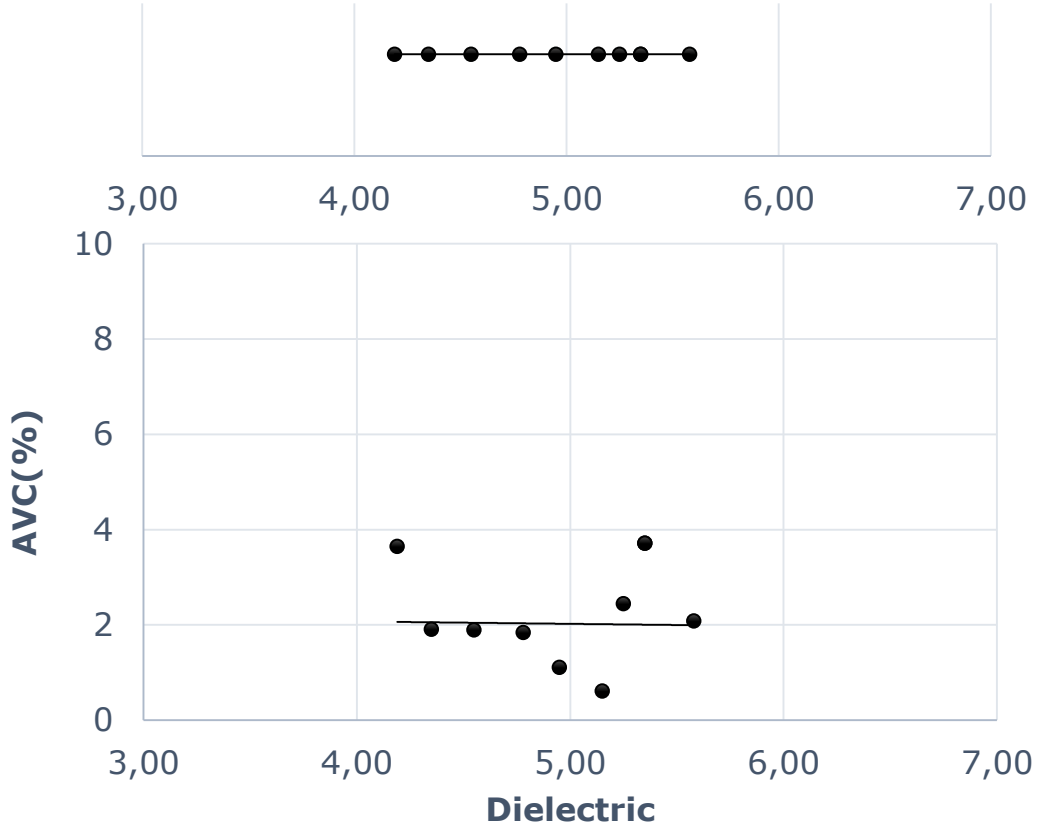
Second layer



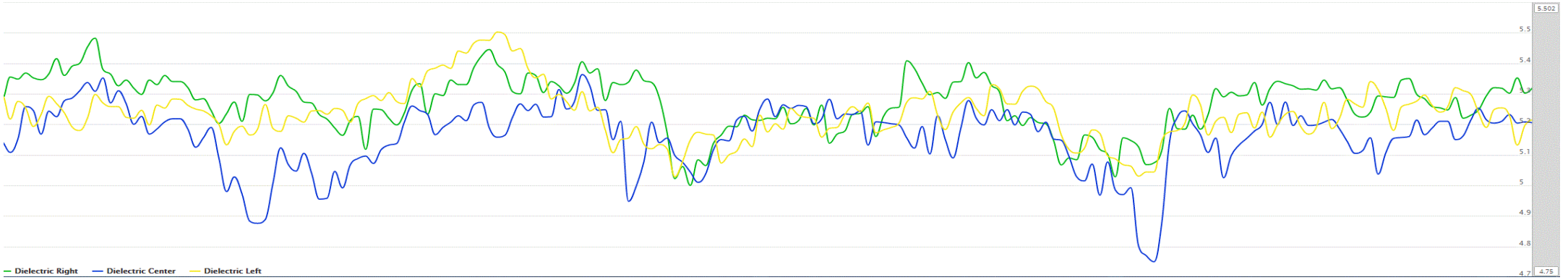
Correlation to AVC

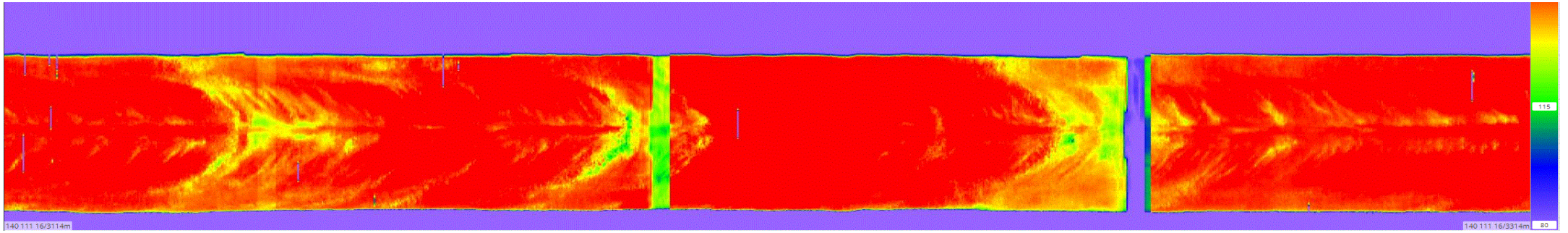
Top layer

Second layer

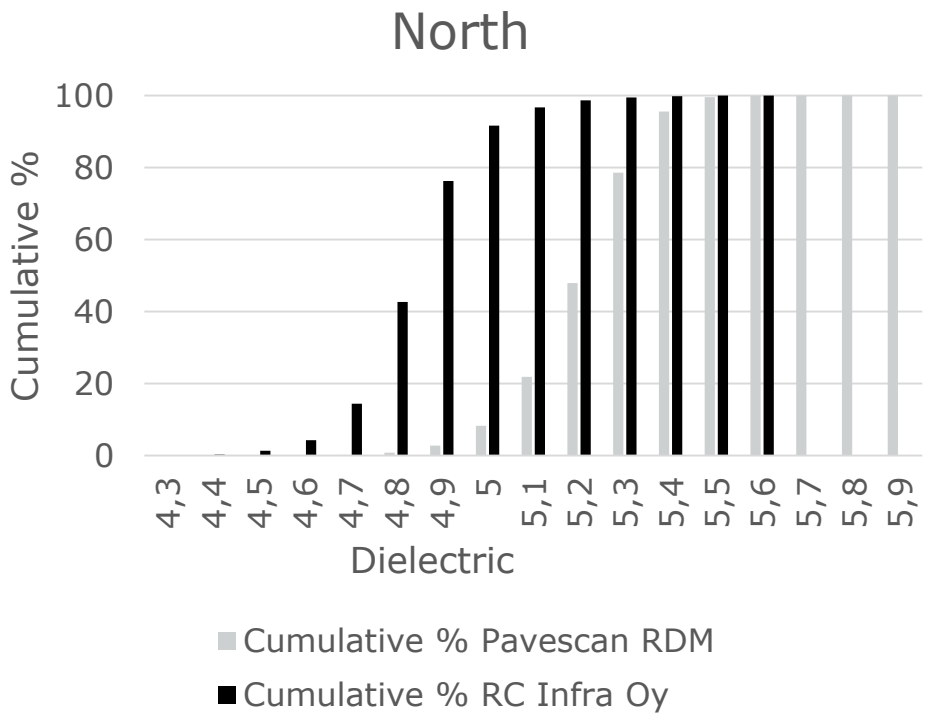


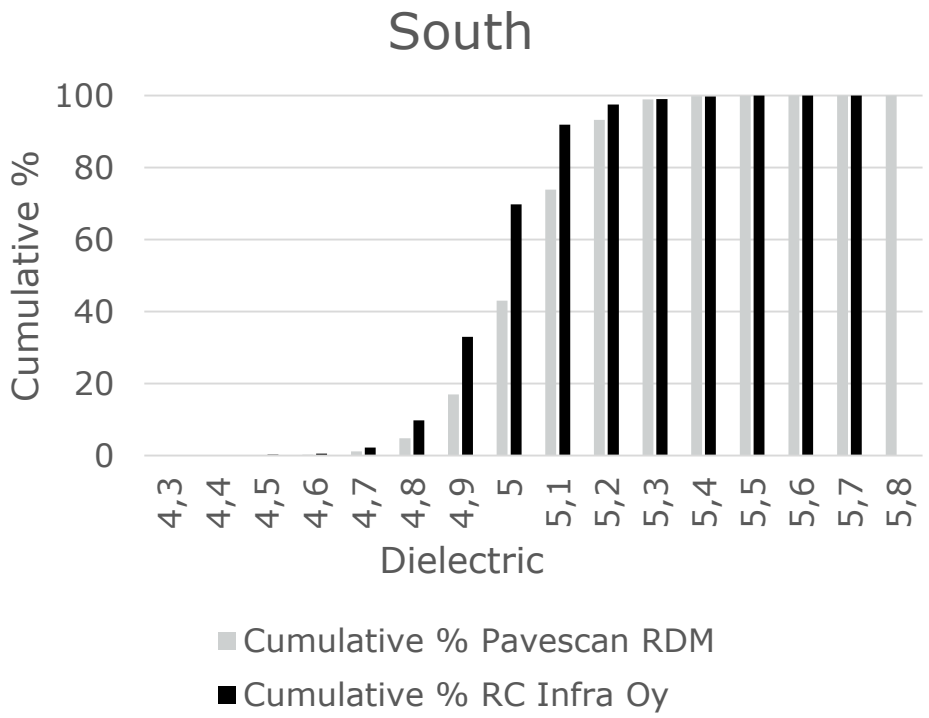
Correlation to paving temperature



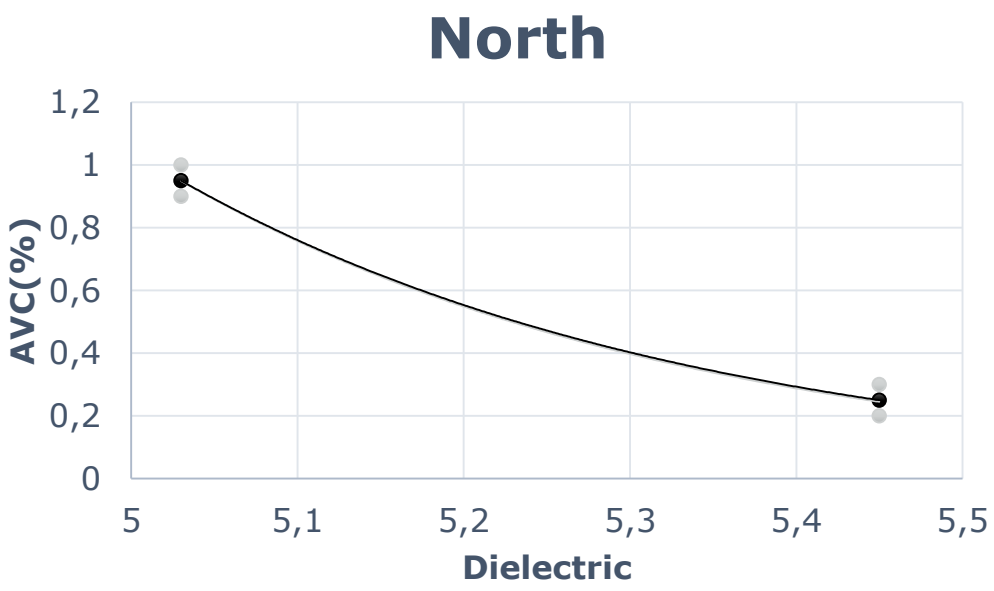


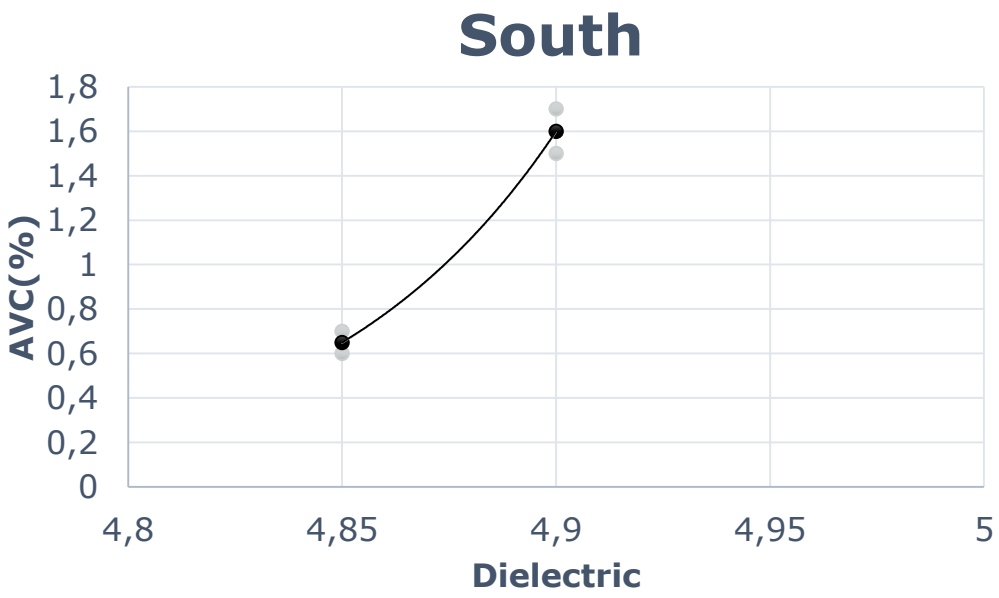
Similarities between systems





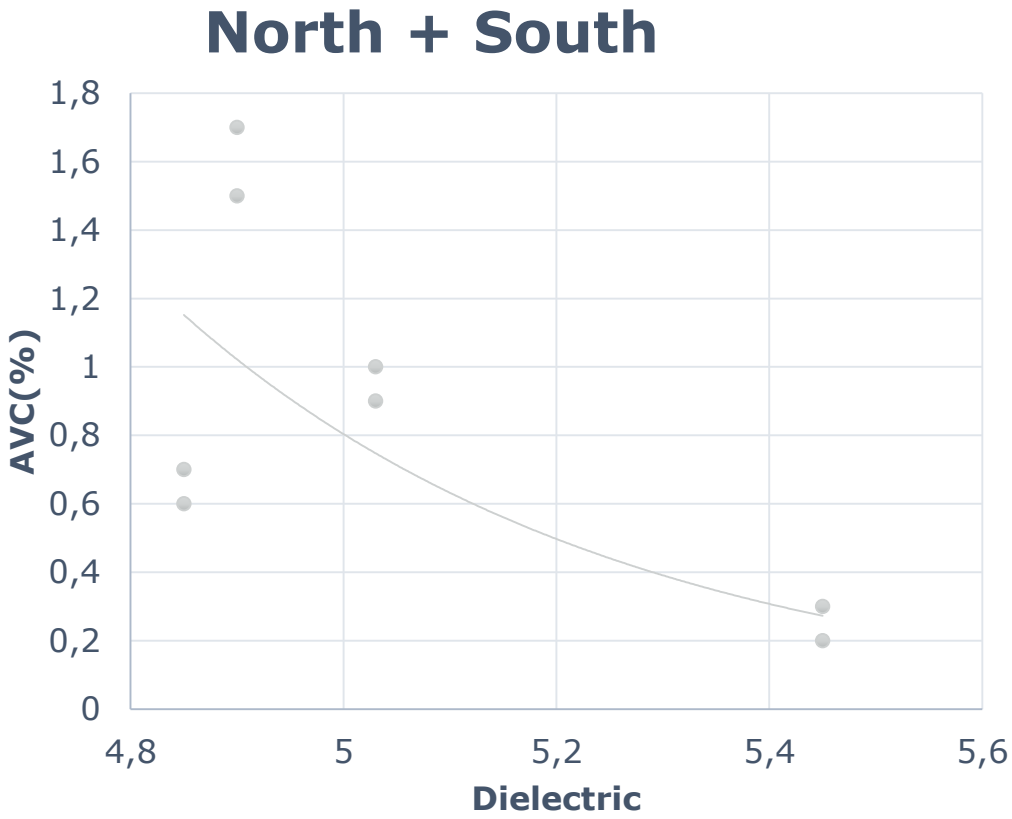
Correlation



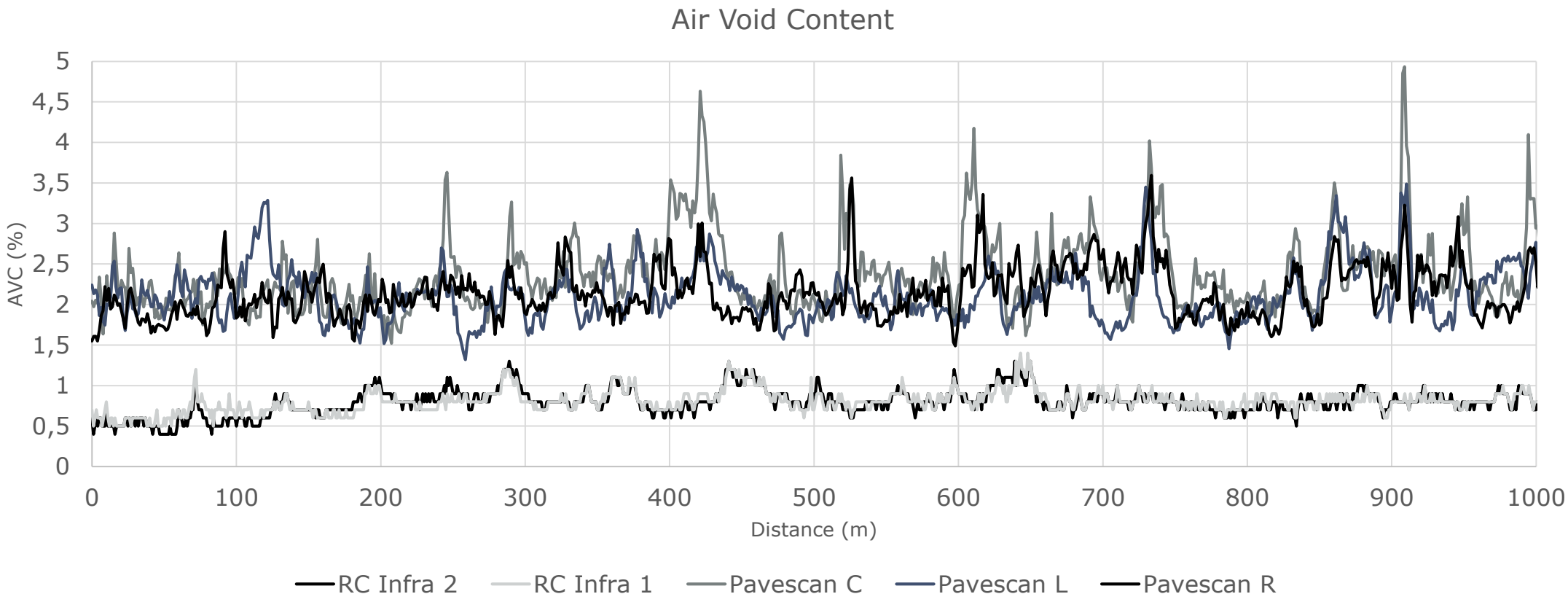


Correlation to AVC

R^2
0,663



Survey Results



Finnish PANK Method for Air Void Content of Asphalt Pavement with GPR.

FINNISH PANK COMPARED TO PAVESCAN METHOD

"A minimum number of ten (10) measurements (scans) per meter are recorded. Measurement time (range) used is 20 ns."

"One measurement covers an area of approximately 300mm x 300mm.

— Chapter 5.4 - Measurements

FINNISH PANK COMPARED TO PAVESCAN METHOD

"…taking one (1) calibration core sample from the pavement under survey (length at least 5 km) that represents well the mean dielectric value calculated after GPR data collection. In addition 2 + 2 representative samples are taken from other sections around mean dielectric value."

— Chapter 5.5 A – Calculation of Air Void Content

Thank you!

Making Future.